







Thin Film Technology Corp.

Product Family: Low Ohm Current Sense Resistors

Part Number Series: WEL Series (Wrapped Electrodes)

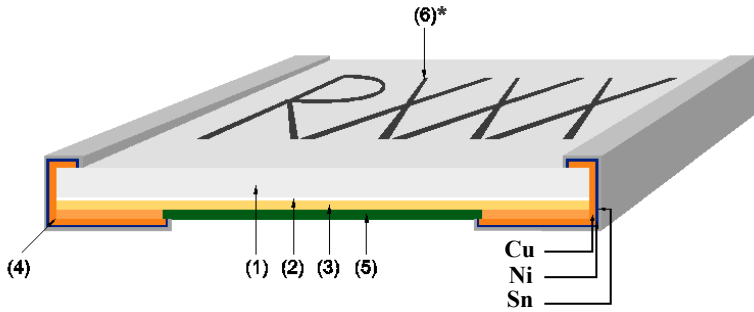


   	<p>Construction:</p> <ul style="list-style-type: none"> • High Purity Alumina Substrate • Metal foil resistive element • Epoxy-resin overcoat • Wrap around electrodes • Sn100 terminations • AEC-Q200 Qualified • Anti-Sulfur 	<p>Features:</p> <ul style="list-style-type: none"> • TCR's down to ± 50 ppm/$^{\circ}$C • Resistance down to 1mΩ available • High power handling in a small package • Optimal linearity in I/V conversion • High volume production suitable for commercial and special applications • Competitive pricing
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Description:

These low ohm current sense resistors are designed for tight resistance tolerance, low noise, long-term stability and high heat dissipation capability in a small package. This series is ideal for use in power management modules, motor control circuits and automotive applications.

Product Construction:



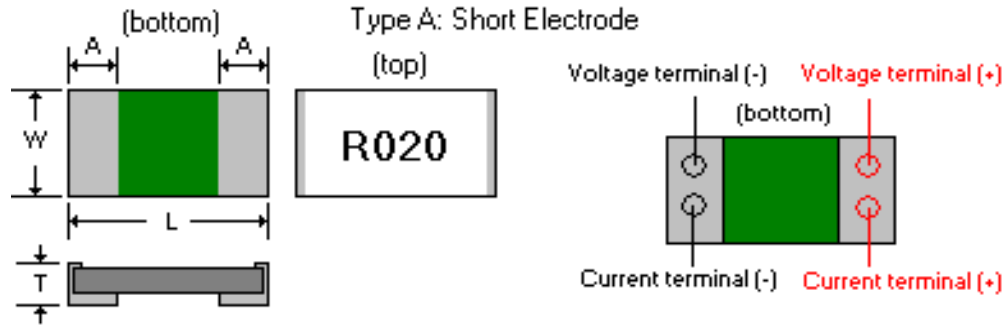
1	2	3	4	5	6
Substrate (Alumina Ceramic)	Adhesion Layer (Epoxy)	Resistive Element (Cu Alloy Foil)	Terminal Electrode (Sn, Ni, Cu)	Protective Coating (Flame-retardant epoxy, UL-94-V0)	Marking* (Flame-retardant epoxy, UL-94-V0)

Part Numbering: Ex: WEL0508MR010F-T5

Product Designator	English Size	Material Code	Resistance Value	Resistance Tolerance	Automotive Grade	T&R Packaging Quantity
WEL	(refer to "type" in electrical tables)	M	Ex. R010 = 10m Ω R100 = 100m Ω (refer to tables)	D = $\pm 0.5\%$ * F = $\pm 1.0\%$ (refer to tables)	A= Automotive AEC-Q200 Leave Blank for Non AEC-Q200	-T1 = 1,000 -T2 = 2,000 -T4 = 4,000 -T5 = 5,000 (refer to tables)

* Note: $\pm 0.5\%$ (D) tolerance is not available for all resistance values. See electrical specifications table.

Product Dimensions:

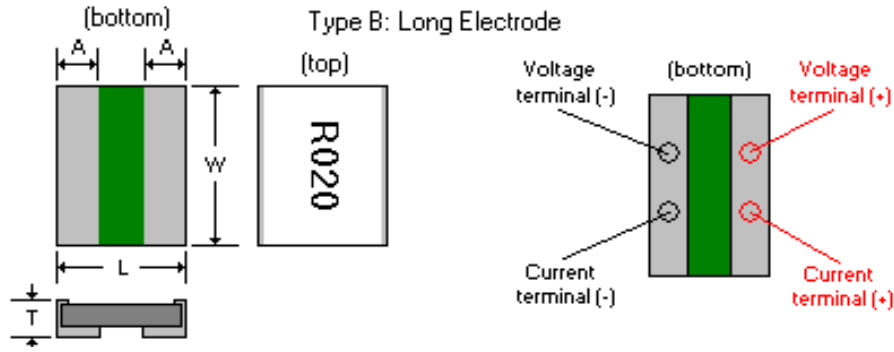


Dimensions in inches (mm in parenthesis)

Part Number	Electrode Type	Resistance Range	Component Dimensions			
			L	W	A	T
WEL0603	A	5mΩ	0.067±0.008 (1.70±0.20)	0.035±0.008 (0.90±0.20)	0.020±0.008 (0.50±0.20)	0.026±0.008 (0.65±0.15)
		6mΩ~100mΩ			0.016±0.008 (0.40±0.20)	
WEL0805	A	3mΩ	0.083±0.008 (2.10±0.20)	0.053±0.008 (1.35±0.20)	0.026±0.008 (0.65±0.20)	0.026±0.008 (0.65±0.20)
		4mΩ~500mΩ			0.020±0.008 (0.50±0.20)	
WEL1206	A	3mΩ	0.130±0.008 (3.30±0.20)	0.067±0.008 (1.70±0.20)	0.047±0.012 (1.20±0.30)	0.026±0.008 (0.65±0.20)
		4mΩ~700mΩ			0.027±0.012 (0.68±0.30)	
WEL2010	A	2mΩ~3mΩ	0.201±0.008 (5.10±0.20)	0.102±0.008 (2.60±0.20)	0.083±0.012 (2.10±0.30)	0.026±0.008 (0.65±0.20)
		4mΩ~700mΩ			0.028±0.012 (0.70±0.30)	
WEL2512	A	2mΩ	0.252±0.012 (6.40±0.30)	0.126±0.012 (3.20±0.30)	0.110±0.012 (2.80±0.30)	0.026±0.008 (0.65±0.20)
		3mΩ			0.102±0.012 (2.60±0.30)	
		4mΩ~700mΩ			0.041±0.012 (1.05±0.30)	
WEL4320	A	2mΩ	0.437±0.012 (11.10±0.30)	0.201±0.012 (5.10±0.30)	0.193±0.012 (4.90±0.30)	0.026±0.008 (0.65±0.20)
		3mΩ			0.179±0.012 (4.55±0.30)	
		4mΩ~100mΩ			0.093±0.012 (2.36±0.30)	
WEL4527	A	2mΩ	0.457±0.039 (11.60±1.0)	0.279±0.039 (7.10±1.0)	0.197±0.016 (5.00±0.40)	0.026±0.012 (0.65±0.30)
		3mΩ~100mΩ			0.106±0.016 (2.70±0.40)	

* Note: Marking is 2 digits (XX) for 0603 case size, 3 digits (XXX) for 0805 and 0508 case sizes, and 4 digits (RXXX) for all other case sizes.

Product Dimensions (Cont.):



Dimensions in inches (mm in parenthesis)

Part Number	Electrode Type	Resistance Range	Component Dimensions			
			L	W	A	T
WEL0508	B	1mΩ~100mΩ	0.053 ±0.008 (1.35± 0.20)	0.083 ±0.008 (2.10 ± 0.20)	0.026 ±0.008 (0.43±0.20)	0.017 ±0.008 (0.65±0.20)
WEL0612	B	1mΩ	0.067±0.008 (1.70±0.20)	0.129±0.008 (3.30±0.20)	0.022±0.012 (0.55±0.30)	0.026±0.008 (0.65±0.20)
		3mΩ			0.020±0.008 (0.50±0.20)	
		2mΩ, 4mΩ~100mΩ			0.016±0.008 (0.40±0.20)	
WEL0815	B	1mΩ~100mΩ	0.087±0.008 (2.20±0.20)	0.150±0.008 (3.80±0.20)	0.024±0.008 (0.61±0.20)	0.026±0.008 (0.65±0.20)
WEL1020	B	1mΩ~100mΩ	0.102±0.008 (2.60±0.20)	0.201±0.008 (5.10±0.20)	0.026±0.008 (0.65±0.20)	0.026±0.008 (0.65±0.20)
WEL1225	B	1mΩ~100mΩ	0.126±0.012 (3.20±0.30)	0.252±0.012 (6.40±0.30)	0.024±0.008 (0.60±0.20)	0.026±0.008 (0.65±0.20)
WEL0830	B	1mΩ~100mΩ	0.102±0.012 (2.60±0.30)	0.299±0.012 (7.60±0.30)	0.027±0.012 (0.68±0.30)	0.026±0.008 (0.65±0.20)
WEL1530	B	1mΩ~100mΩ	0.153±0.012 (3.90±0.30)	0.303±0.012 (7.70±0.30)	0.027±0.012 (0.70±0.30)	0.026±0.008 (0.65±0.20)
WEL1836	B	1mΩ~100mΩ	0.181±0.012 (4.60±0.30)	0.358±0.012 (9.10±0.30)	0.031±0.012 (0.80±0.30)	0.026±0.008 (0.65±0.20)
WEL2043	B	1mΩ~100mΩ	0.201±0.012 (5.10±0.30)	0.437±0.016 (11.10±0.40)	0.035±0.012 (0.90±0.30)	0.026±0.008 (0.65±0.20)

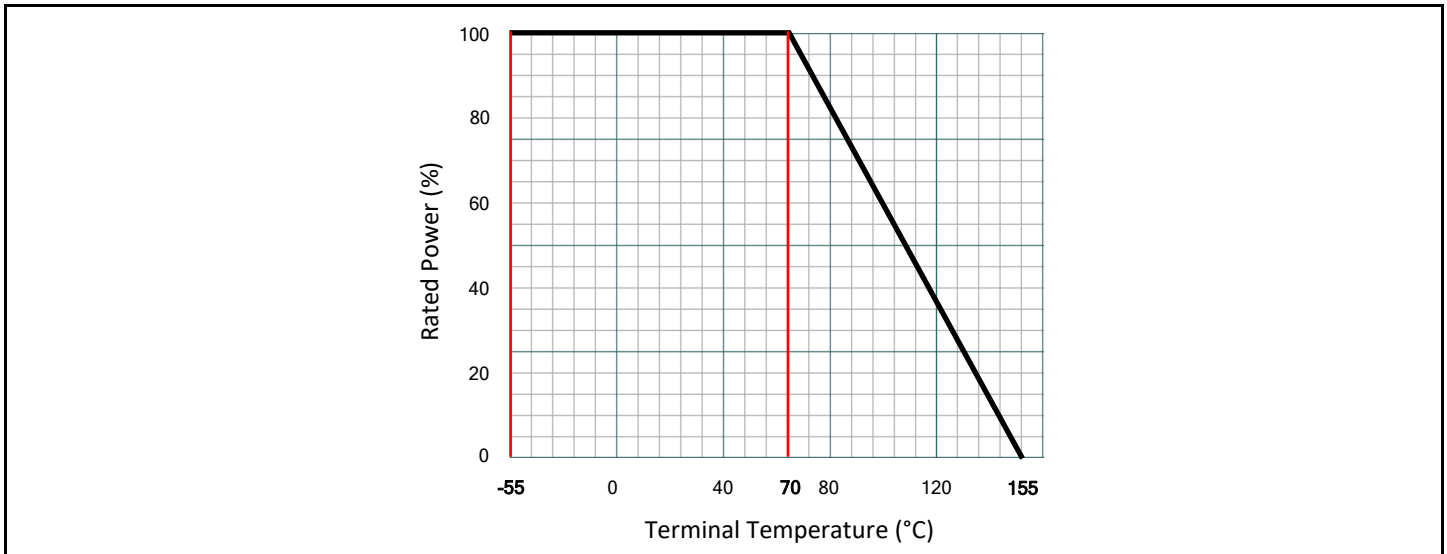
Electrical Specifications:

Type	0603		0805		1206		2010		2512		4320		4527	
Electrode Style	Type "A" - Short Side Electrode													
Metric Size	1608		2012		3216		5025		6432		11050		11470	
Power	0.5 Watts		0.75 Watts		1.0 Watts		1.5 Watts		2.0 Watts		3.0 Watts		4.0 Watts	
Resistance Offering (mΩ)	5~9	10~100	3	4~500	3	4~700	2~9	10~700	2~3	4~700	2~9	10~100	2~9	10~100
Tolerance% (code)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)
Resistance Offering	1mΩ steps													
TCR ± ppm/°C	75	50	75	50	75	50	100	50	75	50	100	50	100	50
Operating Temp. Range	-55°C ~ 155°C													
Rated Voltage	$\sqrt{\text{Power} \times \text{Resistance}}$													
Packaging	5,000 pcs/reel						4,000 pcs/reel				2,000 pcs/reel		1,000 pcs/reel	

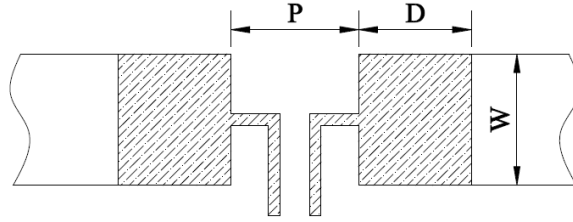
Type	0508		0612		0815		1020		1225		0830		1530		1836		2043	
Electrode Style	Type "B" - Long Side Electrode																	
Metric Size	1220		1632		2040		2550		3264		2276		3876		4590		05110	
Power	1.0 Watts		1.5 Watts		2.0 Watts		2.0 Watts		3.0 Watts		3.0 Watts		4.0 Watts		4.0 Watts		5.0 Watts	
Resistance Offering (mΩ)	1~9	10~100	1~2, 4~9	3*, 10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100
Tolerance% (code)	±1.0 (F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0 (F)	±0.5(D) ±1.0(F)	±1.0 (F)	±0.5(D) ±1.0(F)	±1.0 (F)	±0.5(D) ±1.0(F)	±1.0 (F)	±0.5(D) ±1.0(F)	±1.0 (F)	±0.5(D) ±1.0(F)	±1.0 (F)	±0.5(D) ±1.0(F)	±1.0 (F)	±0.5(D) ±1.0(F)
Resistance Offering	1mΩ steps																	
TCR ± ppm/°C	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50
Operating Temp. Range	-55°C ~ 155°C																	
Rated Voltage	$\sqrt{\text{Power} \times \text{Resistance}}$																	
Packaging	5,000 pcs/reel				4,000 pcs/reel								2,000 pcs/reel					

* Note: 3mΩ in 0612 case size only available in 1.0% (F) tolerance

Power Derating Curve:



Recommended Land Pattern and Dimensions:



Part Number	Electrode Type	Resistance Range	Dimensions in. (mm in parenthesis)		
			P	W	D
WEL0603	A	5mΩ	0.020 (0.50)	0.036 (0.92)	0.053 (1.35)
		6mΩ~7mΩ	0.024 (0.60)		0.051 (1.30)
		8mΩ~12mΩ			
		13mΩ~100mΩ			
WEL0805	A	3mΩ	0.020 (0.50)	0.057 (1.44)	0.061 (1.55)
		4mΩ~7mΩ	0.031 (0.80)		0.055 (1.40)
		8mΩ~500mΩ			
WEL1206	A	3mΩ	0.024 (0.60)	0.072 (1.84)	0.083 (2.10)
		4mΩ~8mΩ	0.047 (1.20)		0.071 (1.80)
		9mΩ~700mΩ			
WEL2010	A	2mΩ	0.028 (0.70)	0.113 (2.88)	0.144 (3.65)
		3mΩ			
		4mΩ	0.106 (2.70)		0.104 (2.65)
		5mΩ~6mΩ			
		7mΩ~9mΩ			
		10mΩ~700mΩ			
WEL2512	A	2mΩ	0.024 (0.60)	0.141 (3.57)	0.171 (4.35)
		3mΩ	0.035 (0.90)		0.165 (4.20)
		4mΩ	0.122 (3.10)		0.122 (3.10)
		5mΩ~8mΩ			
		9mΩ			
		10mΩ~700mΩ			
WEL4320	A	2mΩ	0.043 (1.10)	0.226 (5.75)	0.253 (6.45)
		3mΩ	0.067 (1.70)		0.242 (6.15)
		4mΩ	0.197 (5.00)		
		5mΩ~6mΩ			
		7mΩ~8mΩ			
		9mΩ~100mΩ	0.177 (4.50)		
WEL4527	A	2mΩ	0.047 (1.20)	0.317 (8.05)	0.262 (6.65)
		3mΩ			
		4mΩ			
		5mΩ			
		6mΩ~100mΩ	0.205 (5.20)		0.183 (4.65)

Recommended Land Pattern and Dimensions (Cont.):

Part Number	Electrode Type	Resistance Range	Dimensions in. (mm in parenthesis)		
			P	W	D
WEL0508	B	1mΩ	0.024 (0.60)	0.091 (2.30)	0.043 (1.10)
		2mΩ~100mΩ			
WEL0612	B	1mΩ, 3mΩ	0.020 (0.50)	0.145 (3.68)	0.053 (1.35)
		2mΩ, 4mΩ	0.024 (0.60)		0.051 (1.30)
		5mΩ~100mΩ			
WEL0815	B	1mΩ	0.028 (0.70)	0.168 (4.26)	0.094 (2.40)
		2mΩ~100mΩ			
WEL1020	B	1mΩ	0.039 (1.00)	0.226 (5.75)	0.089 (2.25)
		2mΩ~100mΩ			
WEL1225	B	1mΩ	0.055 (1.40)	0.285 (7.25)	0.093 (2.35)
		2mΩ~100mΩ			
WEL0830	B	1mΩ	0.037 (0.95)	0.340 (8.63)	0.090 (2.28)
		2mΩ~100mΩ			
WEL1530	B	1mΩ	0.067 (1.70)	0.344 (8.74)	0.100 (2.55)
		2mΩ~100mΩ			
WEL1836	B	1mΩ	0.083 (2.10)	0.407 (10.35)	0.106 (2.70)
		2mΩ~100mΩ			
WEL2043	B	1mΩ	0.094 (2.40)	0.498 (12.65)	0.110 (2.80)
		2mΩ~100mΩ			

Reliability Testing:

Test	Test Method	Specification
Resistance Data	Resistance data at 25°C	Must meet datasheet requirements
TCR Data	TCR data at 25°C and 125°C	Must meet datasheet requirements
Dimensional Data	Measure all dimensions specified in datasheet	Must meet datasheet requirements
Short Time Overload JIS-C-5201, 4.13	Applied voltage: 2.5X rated power. Test duration: 5 seconds	±1.0%
Load Life (1) JIS-C-5201-1, 4.25	Test Temperature: 70°C ± 3°C Applied voltage: rated voltage Test period: 1,000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF,	±1.0%
Moisture Resistance (1) JIS-C-5201-1, 4.24	Test Condition: 40°C ± 3°C/90-95% RH Test period: 1,000 hours	±1.0%
Temperature Cycle (1) (Thermal Shock) JESD22-A-104	Repeat 1,000 cycles as follows: -55 ±3°C (30 min.) / +155 ±3°C (30 min.) Transition time of 1 minute maximum	±1.0%
Resistance To Solder Heat #1 J-STD-020	One reflow cycle according to JEDEC J-STD-020, cool down then parts are immersed into a molten solder bath with a temperature of 260°C for a period of 10 ±1 seconds.	Part must meet initial specifications following testing.
Resistance To Solder Heat #2 J-STD-020	Per component MSL classification per J-STD-020 3 reflow cycles	±1.0%
High Temperature Exposure (1) MIL-STD-202, Method 108, Condition D	Test Temperature: Maximum rated operational temperature Test period: 1,000 hours No electrical load	±1.0%

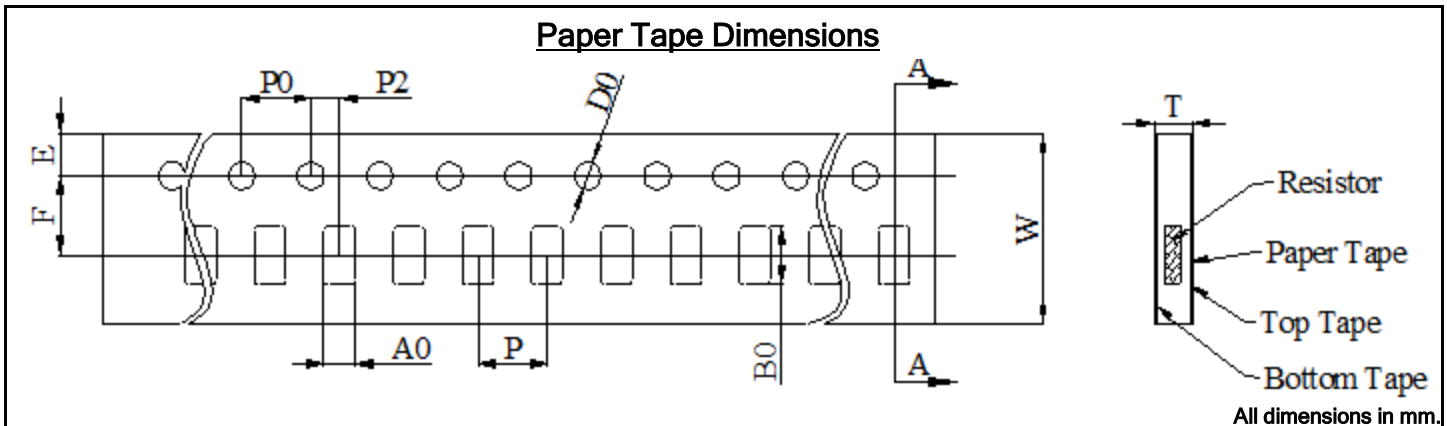
Reliability Testing (Cont.):

Test	Test Method	Specification
HAST (1) (Highly Accelerated Stress Test - Autoclave)	Test Temperature: 121°C ± 2°C Test Pressure: 30 PSIA Test period: 48 hours No electrical load	±1.0%
Terminal Strength AEC-Q200-006	Test Force: 17.7N (derated for size) Duration: 60 ± 1 seconds Parts must be soldered onto a PCB to perform test	±0.5%
Vibration (1) MIL-STD-202, Method 204, Condition B	Frequency: 10 - 2,000Hz Acceleration: 15 ± 1.5gs Test Duration: 20 mins / 12 Cycles	±1.0%
Mechanical Shock (1) MIL-STD-202, Method 213, Condition A	Force: 50 ± 5gs Test Duration: 11 ± 1 milliseconds	±1.0%
Solderability MIL-STD-202, Method 208H, Category 3	Dipped into molten solder for 3 ± 1 seconds at 245 ± 5°C Flux activity type R0	New solder coverage of 90% minimum
Pre-Conditioning	Per component MSL classification per J-STD-020 3 reflow cycles	N/A

AEC-Q200 Reliability Testing:

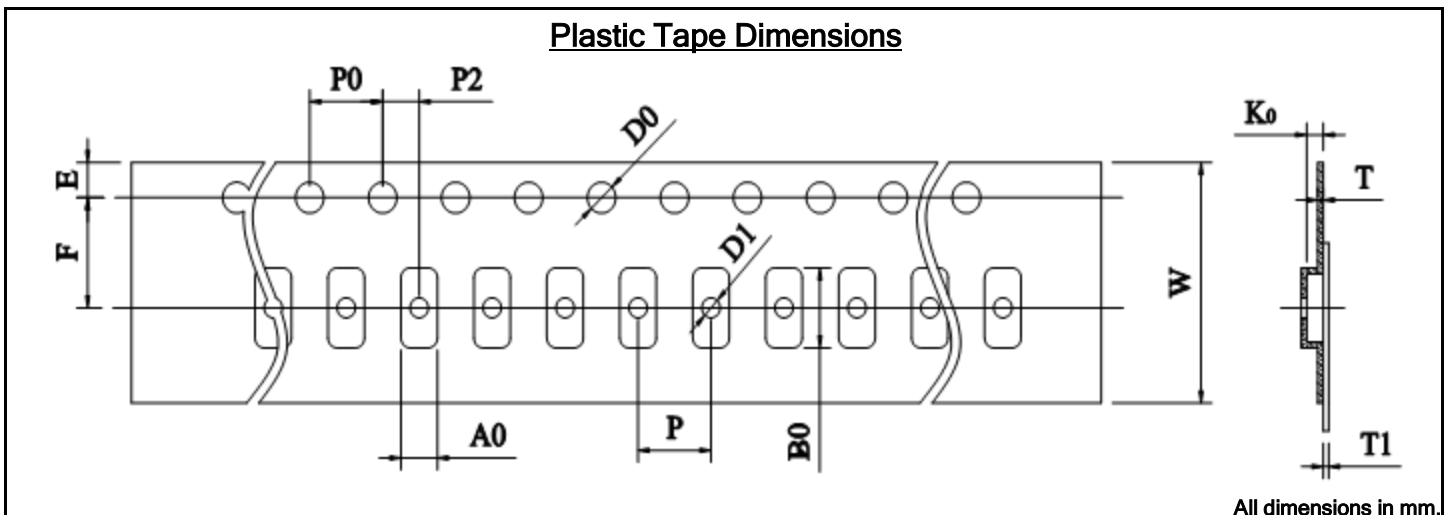
Test	Requirements	Specification
High Temp. Exposure (Storage)	Test Temperature: 155°C ± 2°C Test period: 1,000 hours No electrical load	±(1.0%+0.5mΩ) MIL-STD-202 Method 108
Temperature Cycling (Thermal Shock)	Repeat 1,000 cycles as follows: -55 ± 3°C (30 min.) / +155 ± 3°C (30 min.) Transition time of 1 minute maximum	±(1.0%+0.5mΩ) JESD22 Method JA-104
Biased Humidity	Test Condition: 85°C/85% RH 10% of rated power Test period: 1,000 hours	±(1.0%+0.5mΩ) MIL-STD-202 Method 103
Load Life (Operational Life)	Test Temperature: 70°C ± 3°C Applied voltage: rated power Test period: 1,000 hours	±(1.0%+0.5mΩ) MIL-STD-202 Method 108
Resistance to solvents	3 minute soak 2-3 ounce force 10 strokes / repetition 3 repetitions	±(1.0%+0.5mΩ) MIL-STD-202 Method 215
Mechanical Shock	Force: 100G peak Test Duration: 6 milliseconds Half-sine waveform Velocity: 12.3 ft/sec	±(1.0%+0.5mΩ) MIL-STD-202 Method 213
Vibration	Frequency: 10 - 2,000Hz Acceleration: 5G Test Duration: 20 mins / 12 Cycles	±(1.0%+0.5mΩ) MIL-STD-202 Method 204
Resistance to Soldering Heat	Condition B (Solder Dip - no pre-heat) 260°C ± 5°C	±(1.0%+0.5mΩ) MIL-STD-202 Method 210
ESD	HBM, 100pF, 1.5kΩ Repetition: 5 times	±(1.0%+0.5mΩ) AEC-Q200-002
Solderability	Non-activated Flux Dip: 5-10 seconds SAC Solder Dip: 2 ± 0.5 seconds at 245°C ± 5°C	The covered area >95% J-STD-002
Flammability	V-0 or V-1 are acceptable Electrical test not required	UL-94
Board Flex	90mm span between fulcrums 2mm bend 60 sec minimum holding time.	±(1.0%+0.5mΩ) AEC Q200-005
Terminal Strength (SMD)	Force of 17.7N 60 seconds	±(1.0%+0.5mΩ) AEC Q200-006

Tape and Reel Specifications:



All dimensions in mm.

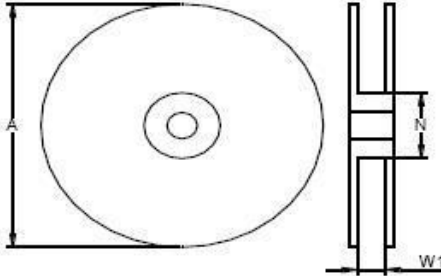
Size	W	P0	P	P2	A0	B0	D0	F	E	T
WEL0603	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	1.10 ±0.10	1.90 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.75 ±0.10
WEL0805	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	1.55 ±0.10	2.30 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.87 ±0.10
WEL1206	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.05 ±0.20	3.65 ±0.20	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.87 ±0.10
WEL0508	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	1.55 ±0.10	2.30 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.87 ±0.10
WEL0612	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.05 ±0.20	3.65 ±0.20	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.87 ±0.10



All dimensions in mm.

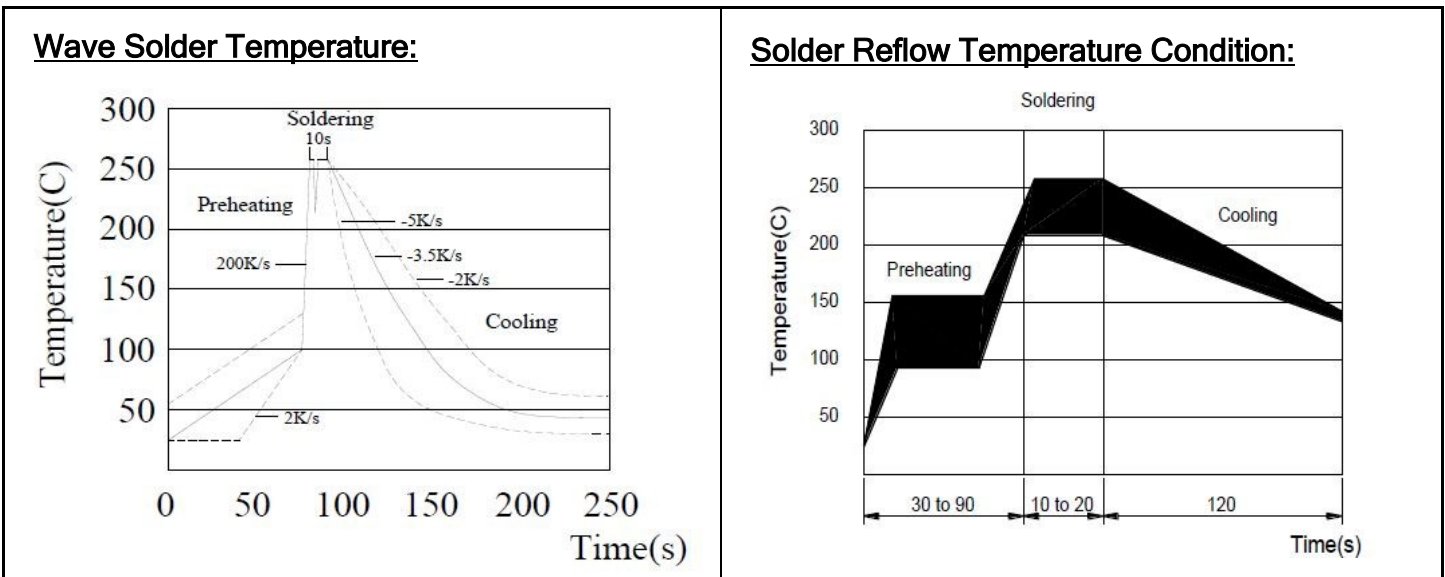
Size	W	P0	P	P2	A0	B0	D0	F	E	T	T1	K0
WEL2010	12.0 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.85 ±0.20	5.45 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max 0.1	0.80 ±0.20
WEL2512	12.0 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	3.40 ±0.20	6.75 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max 0.1	1.00 ±0.20
WEL4320	24.0 ±0.30	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10	5.50 ±0.20	11.5 ±0.20	1.50 ±0.10	11.5 ±0.10	1.75 ±0.10	0.30 ±0.10	Max 0.1	0.90 ±0.20
WEL4527	24.0 ±0.30	4.00 ±0.10	12.0 ±0.10	2.00 ±0.10	7.50 ±0.20	12.0 ±0.20	1.50 ±0.10	11.5 ±0.10	1.75 ±0.10	0.30 ±0.10	Max 0.1	0.90 ±0.20
WEL0815	12.0 ±0.40	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.30 ±0.20	4.10 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max 0.1	0.75 ±0.20
WEL1020	12.0 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.85 ±0.20	5.45 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max 0.1	0.80 ±0.20
WEL1225	12.0 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	3.40 ±0.20	6.75 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max 0.1	1.00 ±0.20
WEL0830	16.0 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.80 ±0.20	8.00 ±0.20	1.50 ±0.10	7.50 ±0.10	1.75 ±0.10	0.30 ±0.10	Max 0.1	0.80 ±0.20
WEL1530	16.0 ±0.30	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10	4.15 ±0.20	7.95 ±0.20	1.50 ±0.10	7.50 ±0.10	1.75 ±0.10	0.30 ±0.10	Max 0.1	0.90 ±0.20
WEL1836	16.0 ±0.30	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10	4.85 ±0.20	9.35 ±0.20	1.50 ±0.10	7.50 ±0.10	1.75 ±0.10	0.30 ±0.10	Max 0.1	0.90 ±0.20
WEL2043	24.0 ±0.30	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10	5.50 ±0.20	11.5 ±0.20	1.50 ±0.10	11.5 ±0.10	1.75 ±0.10	0.30 ±0.10	Max 0.1	0.90 ±0.20

Tape and Reel Specifications (continued):

	Case Size	A	N	W1
		WEL0603	178 ±5.0	60 ±2.0
	WEL0805	178 ±5.0	60 ±2.0	9.0 ±1.0
	WEL1206	178 ±5.0	60 ±2.0	9.0 ±1.0
	WEL2010	178 ±5.0	60 ±2.0	13 ±1.0
	WEL2512	178 ±5.0	60 ±2.0	13 ±1.0
	WEL4320	178 ±5.0	60 ±2.0	24.5 ±1.0
	WEL4527	178 ±5.0	60 ±2.0	24.5 ±1.0
	WEL0508	178 ±5.0	60 ±2.0	9.0 ±1.0
	WEL0612	178 ±5.0	60 ±2.0	9.0 ±1.0
	WEL0518	178 ±5.0	60 ±2.0	13 ±1.0
	WEL1020	178 ±5.0	60 ±2.0	13 ±1.0
	WEL1225	178 ±5.0	60 ±2.0	13 ±1.0
	WEL0830	178 ±5.0	60 ±2.0	17 ±1.0
	WEL1530	178 ±5.0	60 ±2.0	17 ±1.0
	WEL1836	178 ±5.0	60 ±2.0	17 ±1.0
	WEL2043	178 ±5.0	60 ±2.0	24.5 ±1.0

All dimensions in mm..

Soldering Conditions:



Storage Conditions:

Environment Conditions:

Products should be stored under the following environmental conditions.

- Temperature: +5 to +40°C
- Humidity: 45 to 85% relative humidity
- Do not keep products in environments where they may be subject to particulate contamination or harmful gases such as sulfuric acid or hydrogen chloride as it may cause oxidization on electrodes, resulting in poor solderability.
- Products should be stored in a space that does not expose it to high temperatures, vibration, or direct sunlight.
- Products should be stored in the original airtight packaging until use.